

Intelligent Design – Not the Fittest

*"By all means, don't ignore it!" That could be the motto for dealing with intelligent design, which puts forward traditional creationist theories under the guise of science. But **AXEL MEYER** advises sending a clearer message to the general public about what evolutionary biology has brought to light in the 150 years since Charles Darwin – and why his theory of evolution should now be considered fact.*

Those who cavalierly reject the theory of evolution, as not adequately supported by facts, seem quite to forget that their own theory is supported by no facts at all." Herbert Spencer, philosopher and contemporary of Charles Darwin, penned these words with wise foresight, and apparently certain of future hostilities, in 1850, nine years before Darwin's *Origin of Species*.

In many respects, Darwin founded evolutionary biology. However, it took generations of researchers after him to uncover in detail the mechanisms by which new species emerge. Present-day critics of Darwin generally read and cite only his works and ignore the mountains of scientific literature of the following one and a half centuries – this might be philosophico-historically interesting, but it's a scientifically worthless approach. After all, science marches on – and a lot of new things have been learned in the field of evolutionary biology.

Even back then, Jean-Baptiste Lamarck and others had long known that species don't exist forever. Today, we know that the average life expectancy of most species is just a few million years – and that most of the species that ever existed on this planet are already extinct. But it was left to Darwin and Wallace to identify how new species come into being. They developed what 20th-century evolutionary biologist Ernst Mayr termed population thinking: the understanding that hereditary variation and competition for limited resources within a population lead to ever better adaptations and, ultimately, possibly to new species. And Spencer coined the phrase "survival of the fittest."

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We are still a long way from knowing everything about the processes that lead to the origin of new species. Nevertheless, the store of data supporting the fundamental correctness of Darwinian evolution, for example from paleontology, comparative developmental biology, population genetics and genomics, is immense and continues to grow daily. Darwin, for example, did not yet know the genetic basis for his key observation that offspring bear a greater resemblance to their parents than to the average individual in the population. Now that we are decoding not just genes, but entire genomes of more and more species, we are gaining an ever greater understanding of the findings of the British naturalist and generations of evolutionary biologists after him, also – and particularly – at the genetic level.

Evolutionary biology has become *the* fundamental discipline of biology, as already clearly formulated by population geneticist and co-architect of modern synthesis, Theodosius Dobzhansky, in 1973: "Nothing in biology makes sense except in the light of evolution."

Certainly, in evolutionary biology, a few things are still about as puzzling as gravitation in physics. But the empirical evidence for evolution through variation (mutation) and natural selection is so overwhelming that it seems justified to speak, not of a *theory*, but of the *fact* of evolution, as Ernst Mayr had already advocated decades ago.

Darwin's *Origin* ignited an intense and often emotional debate about the consequences of these findings for humans' perception of themselves in the universe and

their implications for religion. It seems that the realization that man, too, is merely a product of chance, mutation and selection is still deeply offensive to the human psyche, at least to some fellow humans. And it is well known that man, in the words of Gerlinde Nyncke, is the only animal that doesn't consider itself to be one. That could explain why otherwise rational human beings ignore evolution – as well as what feeds the current debate: unlike gravitation, religious motivations can cause people not only to question evolution, but even to deny it.

It actually seems futile to even respond to the “scientific” arguments of the creationists or the proponents of intelligent design (ID). These are mostly Protestant-leaning, fundamentalist Christians who are unable or unwilling to reconcile their religious doctrines with the materialistic-scientific world view. Darwin himself and especially his wife Emma were devout Christians – a circumstance, incidentally, that contributed to Darwin delaying the publication of his insights for more than two decades. He saw only too clearly the conflict between his perceptions and the teachings of the church.

Many arguments of Darwin's present-day critics were already raised in the mid-19th century. Back then, the consequences of Darwin's theory – that man descends from primates, is a part of the evolutionary lineage of primates and was thus not created in the image of his maker on the last day of creation – meant, from a religious standpoint, nothing but blasphemy and heresy. A historical example is the debate between Thomas H. Huxley (Darwin's bulldog) and Samuel Wilberforce, Bishop of Oxford, on June 30, 1860.

Better to be descended from apes than from the Bishop

Wilberforce did, in fact, agree with what was so clearly laid out in Darwin's *Origin*: that all things in nature are connected and all life on Earth is integrated in a worldwide network of interactions. However, the conclusion that such diverse things as plants and animals developed from just a single prototype was, in the opinion of this man of God, taking things too far. He called Darwin's theories too speculative, and although he acknowledged the power of evolution at the population level, he didn't want to accept that precisely this force could also engender new species – least of all *Homo sapiens*.

Wilberforce provoked his opponent with the question of whether he – Huxley – claimed his descent from apes through his grandmother on his mother's side or his father's. To this Huxley retorted that he would rather be descended from apes than from a Bishop who abuses his intellectual qualities to obscure the truth. According to

reports, at that moment in the debate, a lady fainted and had to be carried out of the hall

Thomas H. Huxley called himself an agnostic to expose those ecclesiastical gnostics who arrogantly invoked a privileged knowledge – knowledge that scientists had to work very hard to acquire, rather than simply reading it from a single book. Which of them went down as the winner of this historical debate is a matter of contention. But Huxley is said to have pleaded the case for the young evolutionary biology at least to the satisfaction of Darwin's followers, and even that of a few clerics.

Darwin's *Origin* plausibly explained how domesticated animals, through selective breeding – referred to today as artificial selection to differentiate it from natural selection – can change drastically within just a few generations. The sole difference between artificial and natural selection is that breeders proceed according to a plan, while nature doesn't, as the intensity and direction of natural selection differs from one generation to the next. Bishop Wilberforce had to agree with this, too. Nevertheless, he insisted that a creator was perpetually at work in all creatures, and that this was the only way new variants and species could emerge.

It was an acknowledged problem for Darwin that, in his day, hardly any fossil evidence was found – or recognized as such – for intermediate and transitional forms in the animal kingdom. But just two years after his *Origin* was published, the first *Archaeopteryx*, a clear link between reptiles and birds, was discovered in Solnhofen, Germany. And there are now so many transitional fossils that this problem should be clarified once and for all.

What Wilberforce presented in the way of Christian natural theological arguments at the historical debate could be summarized today approximately as: microevolution, yes – macroevolution, never! And Cardinal Schönborn of Vienna raised similar arguments in July 2005 in an article in the New York Times, creating quite a stir and causing the ID wave to reach European shores at last. Here, however, there were more scientifically qualified church officials who apparently were able to reconcile the issue with Catholic doctrines. Particularly the head astronomer at the Vatican, Jesuit George Coyne, declared both intelligently and clearly that there is no conflict between the teachings of the Catholic church and evolutionary biology – including their claims regarding the origin of man. And he went even further, stating that the Darwinian theory of evolution and the Christian faith are not only reconcilable, but that the theory of evolution glorifies God.

Theologian-philosopher Hans Küng, too, recently stated that believers should not presume to understand more about science than scientists do. And even in 1996, at the request of Pope John Paul II, the Papal Academy asserted

that there was absolutely no divine claim to the origin of all species, including man – with the exception of the fact that the human soul was created by God alone. Both scientists and believers, George Coyne also stated, could live with this statement. Back to ID, the stepchild of creationism, which is rooted in fundamentalist Protestantism and interprets the Bible literally – including Genesis, according to which the world and its creatures were created by God within a week. The extreme evolution critics are adamant about the words implying a literal meaning of this text, and they concede an age of just a few thousand years for the Earth. It seems to be a waste of time for enlightened contemporaries to take such religious doctrines seriously in a scientific sense.

Due to its explicitly religious character, in 1987, the US Supreme Court banned creationism in public schools – where, unlike in Germany, religion may not be taught. Following the ban, the American creationists regrouped: they aimed to achieve their goal of smuggling religion into biology classes some other way. This spawned the intelligent design movement, which also occasionally goes by the name “intelligent design science” to lend itself a more scientific guise.

But ID is nothing more than creationism in a new package. The intelligent designer is just another way of saying God, though most ID adherents avoid using this word, as it would reveal their unscientific intentions: they want to drum religiously motivated doubts about evolutionary biology into school children and thus turn back time by 150 years.

Anti-evolutionary actionism repeatedly flares up primarily in the US. Nevertheless, in the city of Dover, the attempt to amalgamate religion and biology was recently quashed by court order. In his decision, Judge Jones of Harrisburg denounced, in no uncertain terms, the motivation of the ID advocates and exposed the creationist roots of ID. He further showed that ID can't be scientifically analyzed, that it eludes scientific methods and has no falsifiable experiments to offer – and is therefore not science.

What theories do the proponents of ID propose? They simply claim that living creatures and their parts are too complex for their existence to be explained by known evolutionary mechanisms alone. They argue that the eye of primates, for example, or the flagellum of bacteria can't have come about through small, incremental evolutionary steps, as any intermediate forms of these organs would not have been able to function, and thus could also not have been selected. Instead, ID postulates an intelligent designer who somehow (this is not further explained) intervened in evolution.



These theological-teleological doctrines are old and have been put forth repeatedly since the time of Bishop Wilberforce – which shows that the arguments of evolution's opponents have not gained in cogency in nearly 150 years. They postulate that “Darwinian evolution can't explain this and that, so it

must be wrong as a whole – ergo our idea must be right.” Judge Jones, too, saw this as a ridiculously unscientific argument; clearly, a completely unproven (and improvable) hypothesis need not be right simply because another is (supposedly) wrong. Any scientific-philosophical approach, especially Karl Popper's, would reveal the hollowness of such argumentation.

Very often, proponents of ID also use probability arguments; they want to show how extremely unlikely the evolution of complex organisms and their genomes is. It is indeed difficult to imagine an evolution lasting billions of years, as it involves coincidences that can be quantified or even predicted only with great difficulty, if at all – similar to quantum mechanics, which belongs to the field of physics, and thus to the most exact of all the natural sciences.

A worthless argument against Darwin

British astronomer Fred Hoyle put forward the “Boeing 747 argument.” This suggested that Darwin's evolution would be like a tornado sweeping through a junkyard and fortuitously assembling a complete jumbo jet. That is highly improbable and thus wrong. Cardinal Schönborn, who is probably Europe's most prominent opponent of evolution, uses a similar and just as incorrect argument, invoking an image that doesn't originate from him, but that he likes to borrow: that of a chimpanzee sitting at a typewriter and “accidentally” typing a Shakespearean sonnet.

These arguments overlook the fact that evolution first discovered letters (the genetic code), then words (genes, exons and protein domains) and finally, syntax. Words or sentences that the fictitious chimpanzee uses, for example, have their own meaning – that is, a selective value – and likewise, wings, engines or tires of an airplane would be useful, and thus valuable in evolutionary terms, even if they were not yet integrated into a Boeing 747.

The so-called mousetrap argument of supporters of ID is supposed to show that only complete structures will function. Accordingly, the individual parts of a mousetrap – and thus also an eye or a flagellum – represent no advantage for selection because, taken alone, they would not work. And for that reason, they conclude, these structures could only have been designed by an



intelligent designer and then somehow fed into evolution. This ignores the fact that, for example, dozens of phylogenetically distinct eyes developed independently in various animal phyla and occur in a wide variety of forms and levels of complexity in organisms that are still alive today – and serve their carriers magnificently.

Furthermore, Walter Gehring of Basel discovered that genetic cascades are often triggered by master control genes and are incredibly conserved through evolution. Pax-6, for example – an important gene that works high up in the cascade of the eye gene – can be interchanged between flies and mice. Once such a network of gene interactions comes into being, it is repeatedly used astonishingly conservatively to develop eyes, even of widely differing types, and in different animal phyla. More specific genes that then determine, for example, the difference between the compound eye of an insect and the simple eye of a vertebrate were obviously not introduced into this cascade until later.

So evolution does not function according to the “Boeing principle,” as complexity is not always created *de novo* from nothing in each species. Our genome, for example, harbors segments of our entire evolutionary history, as the great similarity of our genes to those of other animals and even bacteria shows. And complex structures such as eyes and genomes definitely can arise through known Darwinian processes.

General education is lacking

Another note about Fred Hoyle, who passed away in 2001. He also supported the theory of panspermia, according to which life on Earth came from other planets – a view that warrants serious discussion. But Hoyle postulated this likewise for diseases such as influenza and the bubonic plague. He denied that the pathogens of these and other diseases have their fixed place in the “tree of life” and that they are related to other organisms that live only on Earth and that originated here. So he also supposed, quite logically, that the human nostrils point downward to prevent cosmic viruses from falling into them from above. Moreover, Hoyle questioned the authenticity of the *Archaeopteryx* fossil in London’s British Museum of Natural History, and also denied the existence of the Big Bang – a term he himself had coined.

To their credit the proponents of ID – unlike the Young Earth Creationists – accept that the universe and the Earth are a few billion years old. They also acknowledge the reality of microevolutionary processes, for instance as a result of artificial selection or the development of antibiotic resistances in bacteria. But they deny, just as

Bishop Wilberforce once did, the fact of macroevolution. They disregard the fact that macroevolution doesn’t imply any particularly novel or unexplained or unexplainable evolutionary mechanisms: microevolutionary steps are sufficient to achieve differentiation above the level of species and microevolutionary effects can accumulate over extended periods to result in macroevolutionary patterns. Even animal phyla began as new species once upon a time.

As already mentioned, the reservations against the idea of evolution – and particularly against the primate ancestry of *Homo sapiens* – seem to be based on deep psychological and/or religious reasons. Daniel Dennett and David Sloan Wilson attempted to interpret this need of humans to occupy a special position and the desire for religiousness from a philosophical and evolutionary biology standpoint. Researchers seem to be less susceptible to such feelings: according to a survey conducted by Newsweek in 1987, only 700 of nearly 500,000 scientists in the US are adherents of creationism.

Further surveys have since provided a rough picture of the general status of evolution education on both sides of the Atlantic. About half of all Americans and one in every six Germans believe that God created humans in their current form – as the Bible describes it. Of those who acknowledge an evolutionary process, in the US and Germany alike, one in three believes that God controlled this historical development.

The Brits, whose compatriot Charles Darwin lies buried next to Isaac Newton in Westminster Abbey, are no better: every second Brit accepts the fact of evolution, but two in ten are adherents of creationism or intelligent design – and support the inclusion of these doctrines in biology instruction.

Relevant surveys confirm that acceptance of evolution by natural selection is largely dependent on the level of education. Thus, if a good share of the public – and of the “ecclesiastical ground crew,” as Schönborn called it – still fails to see that *Homo sapiens* is a primate that differs from chimpanzees in only about 1 percent of its genes, and shares a common ancestor with them, then it appears to be largely a matter of inadequate imparting of knowledge. Biologists must share what they have learned since Darwin with a broader public, and thus with all those who still think and argue like Darwin’s contemporary critics.

This could lead to the insight that the great British-American thinker Ashley Montague described so well: “Science has proof without any certainty. Creationists have certainty without any proof.” ●

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